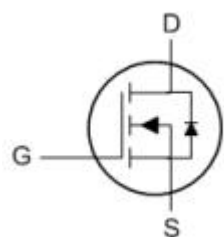
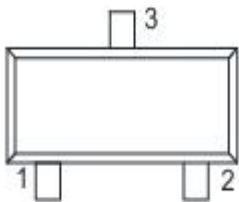


Features ➤ Super Low Gate Charge ➤ Green Device Available ➤ Excellent Cdv/dt effect decline ➤ Advanced high cell density Trench technology	Bvdss	Rdson	ID
	20V	21mΩ	5.2A
	Application ➤ Battery protection ➤ Load Switch ➤ Uninterruptible power supply		

RoHS

Package
 1. Marking and pin assignment2. SOT23 top view3. Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
2300	2300	SOT23	3000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±12	V
Continuous Drain Current, V _{GS} @4.5Vt(1)	I _D @T _A =25°C	5.2	A
Continuous Drain Current, V _{GS} @4.5Vt(1)	I _D @T _A =70°C	3.0	A
Pulsed Drain Current(2)	I _{DM}	16.4	A
Total Power Dissipation(3)	P _D @T _A =25°C	1.0	W
Storage Temperature Range	T _{STG}	-55 to 150	°C
Operating Junction Temperature Range	T _J	-55 to 150	°C

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient(1)	R _{θJA}	170	°C/W
Thermal Resistance Junction-Case(1)	R _{θJC}	-	°C/W

Ordering Information



Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	S	D	
HL2300	SOT23	1	2	3	Tape Reel

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V,	-	-	1.0	μ A
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ± 12V	-	-	± 100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	0.4	0.7	1	V
R _{DS(on)}	Static Drain-Source on-Resistancet(2)	V _{GS} =4.5V, I _D =4A	-	21	27	m Ω
		V _{GS} =2.5V, I _D =3A	-	29	44	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1.0MHz	-	358	-	pF
C _{oss}	Output Capacitance		-	69.3	-	pF
C _{rss}	Reverse Transfer Capacitance		-	58.5	-	pF
Q _g	Total Gate Charge	V _{DS} =10V, I _D =2A, V _{GS} =4.5V	-	5.6	-	nC
Q _{gs}	Gate-Source Charge		-	0.8	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	1	-	nC
Switching Characteristics						
td(on)	Turn-on Delay Time	V _{DS} =10V, I _D =4A, R _{GEN} =3 Ω , V _{GS} =4.5V	-	5	-	ns
tr	Turn-on Rise Time		-	30	-	ns
td(off)	Turn-off Delay Time		-	48	-	ns
tf	Turn-off Fall Time		-	36	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _s	Maximum Continuous Drain to Source Diode Forward Current		-	-	4	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	16	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _s =4A	-	-	1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics

Figure 1: Output Characteristics

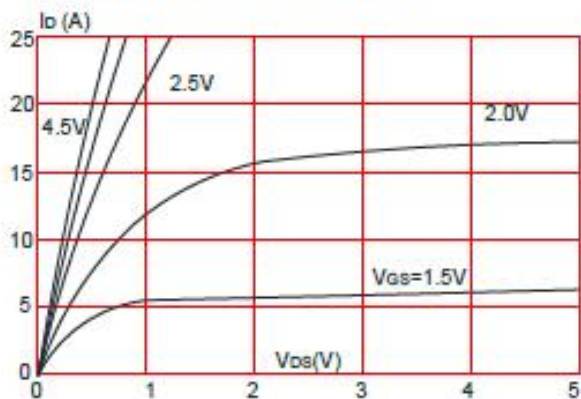


Figure 2: Typical Transfer Characteristics

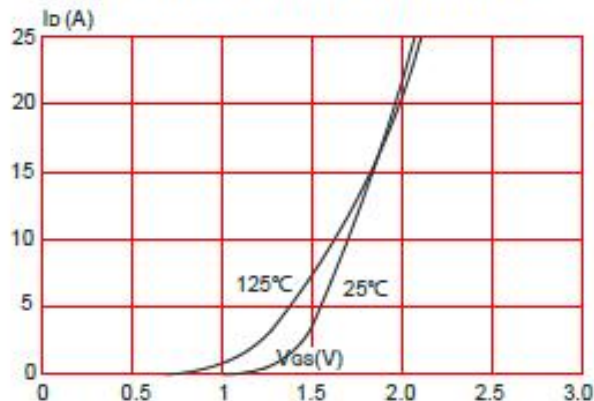


Figure 3: On-resistance vs. Drain Current

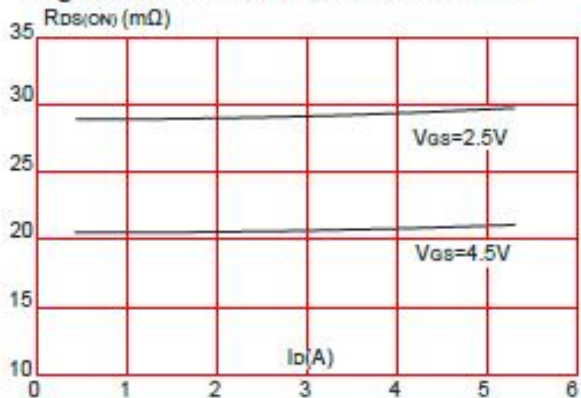


Figure 4: Body Diode Characteristics

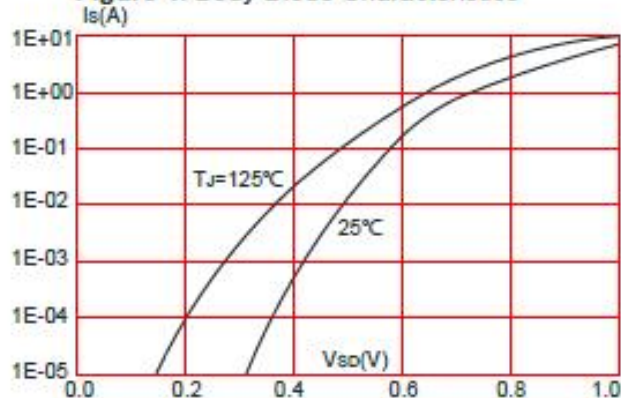


Figure 5: Gate Charge Characteristics

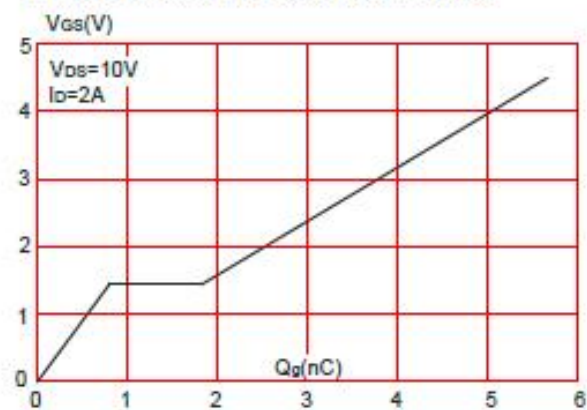


Figure 6: Capacitance Characteristics

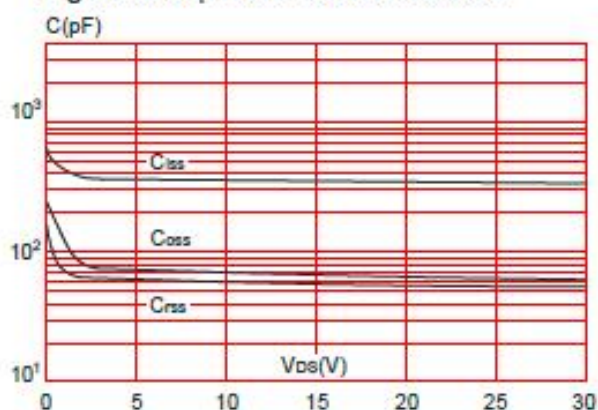


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

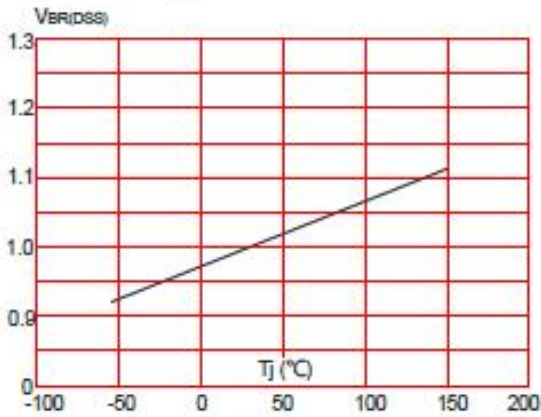


Figure 8: Normalized on Resistance vs. Junction Temperature

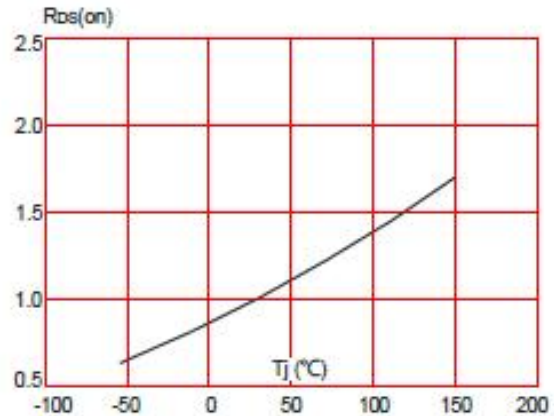


Figure 9: Maximum Safe Operating Area

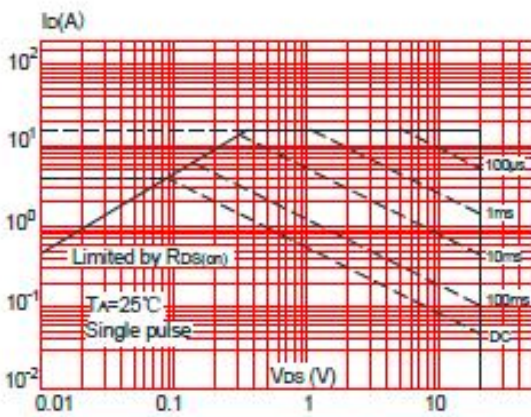


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

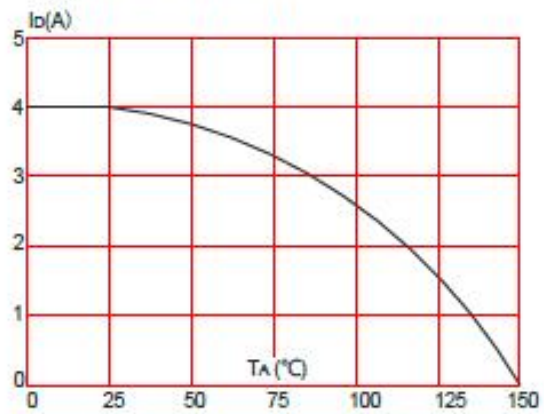
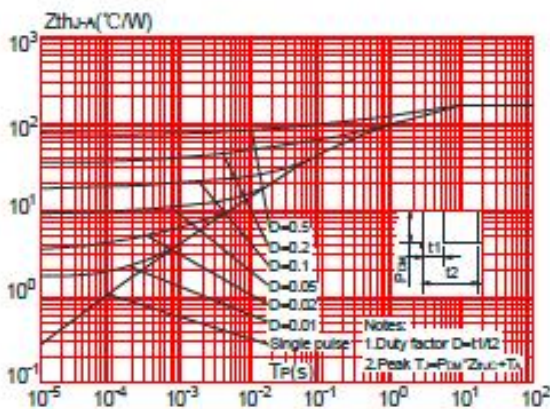
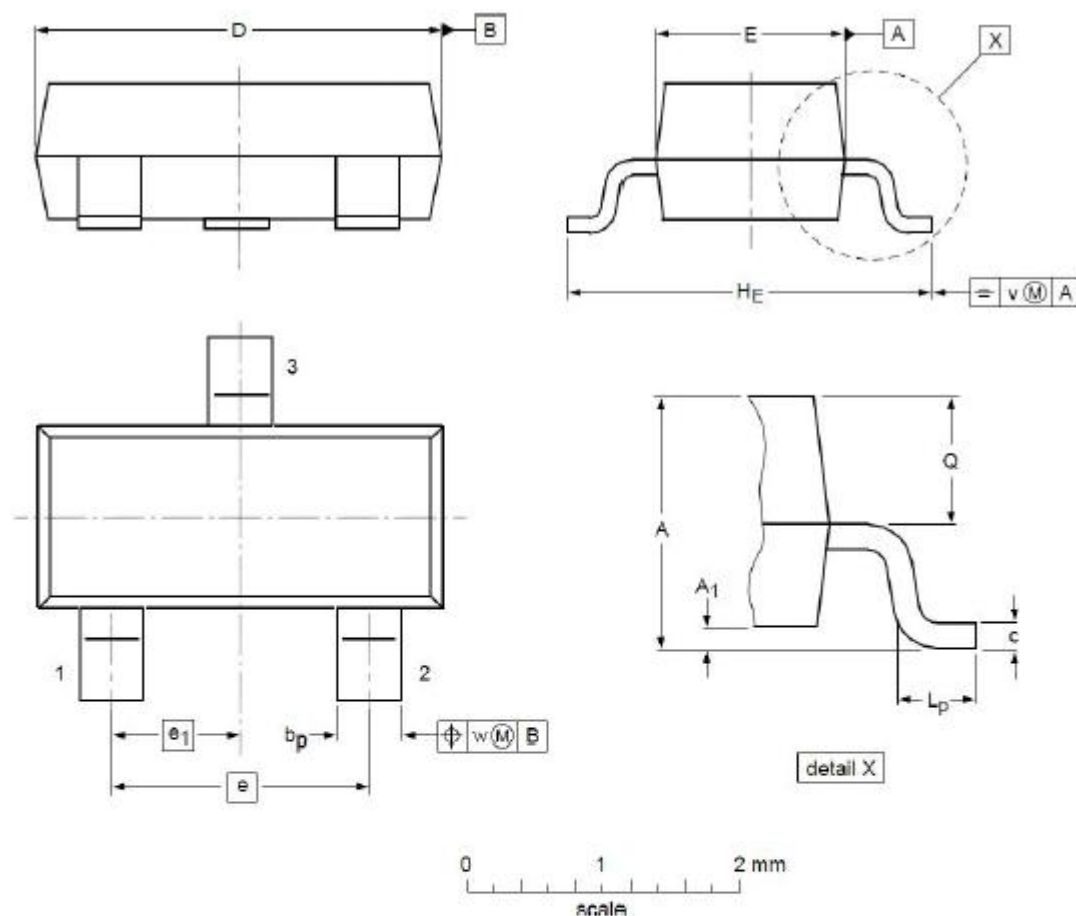


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Dimensions

➤ SOT23



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A ₁	0.01	0.05	0.10
b _p	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e ₁	--	0.95	--
H _E	2.25	2.40	2.55	L _p	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				



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